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EXAMINER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Response to Arguments

1. The affidavit filed on 12/13/2007 under 37 CFR 1.131 has been considered but is ineffective to overcome the references used in the previous office action. Because:

- a. The declaration is signed by three of the four named inventors of the present application. Applicants fail to submit sufficient documents showing the fourth inventor refused to sign the request or could not be reached after diligent efforts.
- b. The evidence submitted is insufficient to establish a conception of the invention prior to the effective date of the references used in the previous office action. While conception is the mental part of the inventive act, it must be capable of proof, such as by demonstrative evidence or by a complete disclosure to another. Conception is more than a vague idea of how to solve a problem. The requisite means themselves and their interaction must also be comprehended. See *Mergenthaler v. Scudder*, 1897 C.D. 724, 81 O.G. 1417 (D.C. Cir. 1897). Submitted documents fail to show some important features of the invention such as generating at least one reference field based, at least in part, on the at least one field in the received signal and on a channel estimation signal, the channel estimation signal being distinct from the received signal and representative of at least one characteristic of the wireless communication channel.

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2. Since the declaration field on 12/13/2007 under 37 CFR 1.131 is ineffective the previous rejections are maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 5, 12-14, 16, 17, 25, 28, 33, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano (EP 1367752 (see the IDS cited by the Applicant)), in view of Tzannes et al. (hereafter, referred as Tzannes) (US 2004/0047296).

As to claim 1, Sano discloses a method for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), the method comprising the steps of: receiving a signal from the wireless communication channel (see Fig. 1), the received signal comprising at least one field (i.e. the common pilot portion); generating at least one reference field (see the outputs of the fading compensation blocks) based, at least in part, on the at least one field in the received signal (see the outputs of the delay unit) and on a channel estimation signal (see the outputs of the channel estimator) (see Fig. 1 and column 6, lines 44-48, see the output of the), the channel estimation signal being distinct from the received signal and representative of at least one characteristic of the wireless communication channel (i.e. the SIR); and generating a signal quality estimate (see the outputs of the SIR

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calculator blocks) as a function of the at least one field in the received signal (i.e. the delayed version of the field) and the generated at least one reference field (column 6, lines 48-58). Sano discloses all the subject matters claimed in claim 1, except that the field is modulated and encoded in a substantially fixed manner. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packet duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate = 1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize the communication data rate (see the abstract).

As to claim 5, Sano further discloses delaying of the at least one field in the received signal by an amount substantially equal to a latency associated with generating the at least one reference field (see column 6, lines 49-51).

As to claim 12, Tzannes discloses that at least a portion of the received signal is organized as an Institute of Electrical and Electronics Engineers (IEEE) standard 802.11 frame, the at least one field in the received signal comprising a SIGNAL field in the IEEE 802.11 frame (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to allow the host to use different transmission rates by using the IEEE standard 802.11a and make the system more flexible.

As to claim 13, Sano further shows that channel estimation signal is obtained at least prior to generating the at least one reference field (i.e. outputs of the fading compensation unit) (see Fig. 1).

As to claim 14, Sano further shows that the received signal comprises at least one training symbol (i.e. the pilot symbol) and the channel estimation signal is computed based at least in part on the at least one training symbol in the received signal (see Fig. 1).

As to claim 16, Sano discloses a method for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), the method comprising the steps of: receiving a signal from the wireless communication channel (see Fig. 1), the received signal comprising at least one field (i.e. the common pilot portion); measuring at least one characteristic corresponding to the at least one field in the received signal (i.e. measuring the signal to interference ratio) (see column 5, lines 56-58); and generating a signal quality estimate (see the outputs of the SIR blocks) as a function of the at least one field in the received signal

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(i.e. the delayed version of the field) and the generated at least one reference field (see the outputs of the fading compensation units, and column 6, lines 48-58). Sano discloses all the subject matters claimed in claim 16, except that the field is modulated and encoded in a substantially fixed manner. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packet duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate $=1/2$ (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize the communication data rate (see the abstract).

As to claim 17, Sano discloses that characteristic comprises signal to interference ratio (or signal to noise ratio) of the at least one field in the received signal (see column 5, lines 56-58).

As to claim 25, Sano discloses an apparatus for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6,

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lines 56-58), for generating at least one reference field (see the outputs of the fading compensation units) (inherently by using a controller) based, at least in part, on the at least one field and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being distinct from the received signal and representative of at least one characteristic of the wireless communication channel (i.e. the SIR); and generating a signal quality estimate (see the outputs of the SIR blocks) as a function of the at least one field in the received signal (i.e. the delayed version of the field) and the generated at least one reference field (see the outputs of the fading compensation, and column 6, lines 48-58). Sano discloses all the subject matters claimed in claim 25, except that the field is modulated and encoded in a substantially fixed manner. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packet duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e., 6Mbps BPSK, code rate = 1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver

can correctly receive the signal field which contains the important timing information and as the result maximize the communication data rate (see the abstract).

As to claim 28, Sano further discloses that the step of delaying the at least one field in the received signal by an amount substantially equal to a latency associated with generating the at least one reference field (see column 6, lines 49-51).

As to claim 33, Sano further shows that channel estimation signal is obtained at least prior to generating the at least one reference field (i.e. output of the fading compensation units) (see Fig. 1).

As to claim 38, Sano discloses an apparatus for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), for generating at least one reference field (inherently by using a controller) based, at least in part, on the at least one field and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being distinct from the received signal representative of at least one characteristic of the wireless communication channel (i.e. the SIR); and generating a signal quality estimate (See the outputs of the SIR blocks) as a function of the at least one field in the received signal (i.e. the delayed version of the field) and the generated at least one reference field (see the outputs of the fading compensation units and column 6, lines 48-58). Sano discloses all the subject matters claimed in claim 38, except that the field is modulated and encoded in a substantially fixed manner. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized

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communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packet duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate = 1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract).

4. Claims 2-4, 6, 26, 27, 29, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano and Tzannes, further in view of Mobin et al. (hereafter, referred as Mobin) (US 6,522,696).

As to claims 2 and 26, Sano and Tzannes disclose all the subject matters claimed in claims 1 and 25, except that the step of generating the signal quality estimate comprises measuring a difference between one or more constellation points associated with the at least one reference field and one or more corresponding constellation points associated with the at least one field in the received signal. Mobin discloses a method for determining channel estimation in a communication system (see the abstract). Mobin further discloses that a viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the

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at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 19-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph).

As to claim 3, Mobin further discloses that the measured difference comprises a Euclidean distance (see column 10, line 28)). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin to reduce frequency offset errors in a communication system (see column 1, last paragraph).

As to claims 4 and 27, Mobin further disclose that the step of generating the signal quality estimate comprises the steps of: aligning the one or more constellation points associated with the at least one field in the received signal with the one or more corresponding constellation points associated with the at least one reference field; and generating difference signals for each of at least a portion of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the corresponding at least one reference field (see column 10, lines 12-35). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph).

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As to claims 6 and 29, Sano and Tzannes disclose all the subject matters claimed in claims 1 and 25, except for generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field; and determining a magnitude of the difference signal, the signal quality estimate being a function of the magnitude of the difference signal. Mobin discloses generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field (see column 10, lines 12-35); and determining a magnitude of the difference signal (see column 10, line 28), the signal quality estimate being a function of the magnitude of the difference signal (see line 30). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph).

As to claim 34, Sano discloses an apparatus for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), for generating at least one reference field based (i.e. the outputs of the fading compensation units) (inherently by using a processor), at least in part, on the at least one field and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being distinct from the received signal and representative of at least one characteristic of the wireless communication channel (i.e. the SIR). Sano discloses all the subject matters claimed in claim 34, except that the field is modulated and encoded in a substantially fixed manner. Sano also does not disclose a comparator for generating a signal quality estimate as a function of the at least one

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field in the received signal and the generated at least one reference field. As to the first limitation, Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packet duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e., 6Mbps BPSK, code rate = 1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract). As to the second limitation, Mobin discloses a method for determining channel estimation in a communication system (see the abstract). Mobin further discloses that a viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 19-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano

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and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph).

5. Claims 7-9, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, further in view of Balachandran et al. (hereafter, referred as Balachandran) (US 6,215,827).

As to claims 7 and 30, Sano, Tzannes and Mobin disclose all the subject matters claimed in claims 6 and 29, except averaging at least a portion of magnitudes of difference signals corresponding to a plurality of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the at least one reference field for a given one of the samples, the signal quality estimate being a function of the averaged magnitudes. Balachandran, in the same field of endeavor, discloses a system and method to measure channel quality in terms of signal to interference ratio (see the abstract). Balachandran further discloses using weighted (i.e. averaged) Euclidean distance metric as SIR metric (see column 7, lines 63). It would have been obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric as suggested by Balachandran (see column 7, lines 52-53 and 61-63).

As to claims 8 and 31, Balachandran shows that the averaging step comprises adding a magnitude value corresponding to a present sample in the at least one field in the received signal to a magnitude value corresponding to a previous sample in the at least one field in the received signal (see column 7, lines 35-63). It would have been

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obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric as suggested by Balachandran (see column 7, lines 52-53 and 61-63).

As to claim 9, Tzannes discloses uses SIGNAL field header in the packet (see paragraph 0066). According to the IEEE 802.11a standard, inherently this SIGNAL field contains 48 bits.

6. Claims 10 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, further in view of Li et al. (hereafter, referred as Li) (US 2003/0157914).

As to claims 10 and 32, Sano and Tzannes disclose all the subject matters claimed in claims 1 and 25, except for generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field; and determining a magnitude of the difference signal, the signal quality estimate being a function of the magnitude of the difference signal. Mobin discloses generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field (see column 10, lines 12-35); and determining a magnitude of the difference signal (see column 10, line 28), the signal quality estimate being a function of the magnitude of the difference signal (see line 30). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin to reduce frequency offset errors in a communication system (see column 1, last paragraph). Sano, Tzannes and Mobin disclose all the subject matters claimed in claims 10 and 32, except that

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instead of measuring the magnitude of the difference signal, power of the difference signal could be measured. Li discloses a communication apparatus wherein the residual interfering signal is removed to improve the quality of the received signal (see the abstract). Li further discloses that the reception quality of the signal is continuously monitored by checking the power or amplitude of each sub-band signal (see paragraph 0025). Since it is well known in the art that it is easier to measure the power of the incoming signal instead of its magnitude; therefore it would have been obvious to one of ordinary skill in the art at the time of invention to measure power of the incoming signal to make the system more cost effective.

7. Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, Li, further in view of Balachandran.

As to claim 11, Sano, Tzannes, Mobin and Li disclose all the subject matters claimed in claim 10, except averaging at least a portion of magnitudes of difference signals corresponding to a plurality of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the at least one reference field for a given one of the samples, the signal quality estimate being a function of the averaged magnitudes. Balachandran discloses a system and method to measure channel quality in terms of signal to interference ratio (see the abstract). Balachandran further discloses using weighted (i.e. averaged) Euclidean distance metric as SIR metric (see column 7, lines 63). It would have been obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric

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as suggested by Balachandran (see column 7, lines 52-53 and 61-63). As already disclosed in rejection of claim 10, Li discloses that the reception quality of the signal is continuously monitored by checking the power or amplitude of each sub-band signal(see paragraph 0025). Since it is well known in the art that it is easier to measure the power of the incoming signal instead of its magnitude; therefore it would have been obvious to one of ordinary skill in the art at the time of invention to measure power of the incoming signal to make the system more cost effective.

8. Claims 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano and Tzannes, further in view of Balachandran.

As to claims 15, Sano shows that the received signal comprises a second field (i.e. a data field) (see Fig. 4), however, Sano and Tzannes fail to disclose that the second field having a variable modulation and encoding, and changing at least one of the modulation and the encoding of the second field based, at least in part, on the signal quality estimate. Balachandran, in the same field of endeavor, discloses a communication system apparatus comprising an encoded and modulation decision unit 258, which determines the correct encoding and modulation scheme in response to the received SIR estimate 274 from the receiver 261 (see column 14, lines 7-16). Balachandran further discloses that the adaptive channel encoder and modulator 256 then encodes and modulates the transmit data stream 252 to a predetermined scheme and transmits the information (interpreted as data) through the channel. It would have been obvious to one of ordinary skill in the art at the time of invention to adaptively change the

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transmission rate based on the feedbacks from the receiver to improve the efficiency of the system as suggested by Balachandran (see column 1, lines 25-38).

9. Claims 18-20, 23, 24, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, and Mobin, further in view of Balachandran.

As to claim 18, Sano discloses a method for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), the method comprising the steps of: receiving a signal from the wireless communication channel (see Fig. 1), the received signal comprising at least one field (i.e. the common pilot portion); generating at least one reference field (see the outputs of the fading compensation units) based, at least in part, on the at least one field in the received signal and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being distinct from the received signal and representative of at least one characteristic of the wireless communication channel (i.e. the SIR). Sano discloses all the subject matters claimed in claim 18, except that the field is modulated and encoded in a substantially fixed manner. Sano also does not disclose comparing the at least one field in the received signal with the at least one reference field and generating a difference signal corresponding thereto; generating a signal quality estimate as a function of the difference signal; and modifying the data transmission rate of the transmitter based on the signal quality estimate. As to the first limitation, Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters

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(see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packet duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate = 1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract). As to the second limitation, Mobin discloses a method for determining channel estimation in a communication system (see the abstract). Mobin further discloses that a viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 19-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph). Sano, Tzannes, and Mobin disclose all the subject matters claimed in claim 18, except for modifying the data transmission rate of the transmitter based, at least in part, on the signal quality estimate.

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Balachandran, in the same field of endeavor, discloses a communication system apparatus comprising an encoded and modulation decision unit 258, which determines the correct encoding and modulation scheme in response to the received SIR estimate 274 from the receiver 261 (see column 14, lines 7-16). Balachandran further discloses that the adaptive channel encoder and modulator 256 then encodes and modulates the transmit data stream 252 to a predetermined scheme and transmits the information (interpreted as data) through the channel. It would have been obvious to one of ordinary skill in the art at the time of invention to adaptively change the transmission rate based on the feedbacks from the receiver to improve the efficiency of the system as suggested by Balachandran (see column 1, lines 25-38).

As to claim 23, Sano discloses a method for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), the method comprising the steps of: receiving a signal from the wireless communication channel (see Fig. 1), the received signal comprising at least one field (i.e. the common pilot portion); measuring at least one characteristic corresponding to the at least one field in the received signal (i.e. measuring the signal to interference ratio) (see column 5, lines 56-58). Sano discloses all the subject matters claimed in claim 23, except that the field is modulated and encoded in a substantially fixed manner. Sano also does not disclose generating a signal quality estimate as a function of the difference between the at least one characteristic corresponding to the first field in the received signal and at least one threshold corresponding to the at least one characteristic; and modifying at least one of the modulation and encoding of the second

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field base on the signal quality estimate. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packet duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate = 1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract). As to the second limitation, Mobin discloses a method for determining channel estimation in a communication system (see the abstract). Mobin further discloses that the sub-frame bit error quality indication signal or channel quality indication signal corresponds to the number of mismatches in the bits (interpreted as one characteristic of the received signal) received from the channel encoder 44 and deinterleaver 36, or alternatively equalizer 34. Mobin further discloses that the quality signal is declared acceptable by automatic frequency correction unit 58, if the bit error count over a speech frame is below a predetermined threshold (see column 7, lines 12, 13, and 33-39). It would have

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been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph). Sano, Tzannes, and Mobin disclose all the subject matters claimed in claim 23, except for modifying the data transmission rate of the transmitter based, at least in part, on the signal quality estimate. Balachandran, in the same field of endeavor, discloses a communication system apparatus comprising an encoded and modulation decision unit 258, which determines the correct encoding and modulation scheme in response to the received SIR estimate 274 from the receiver 261 (see column 14, lines 7-16). Balachandran further discloses that the adaptive channel encoder and modulator 256 then encodes and modulates the transmit data stream 252 to a predetermined scheme and transmits the information (interpreted as data) through the channel. As to the limitation regarding a second field in the data packet; Sano shows that the received signal comprises a second field (i.e. a data field) (see Fig. 4), however, Sano, Tzannes, and Mobin fail to disclose that the second field having a variable modulation and encoding, and changing at least one of the modulation and the encoding of the second field based, at least in part, on the signal quality estimate. Balachandran further discloses that the adaptive channel encoder and modulator 256 then encodes and modulates the transmit data stream 252 to a predetermined scheme and transmits the information (interpreted as data or second field of data packet) through the channel. It would have been obvious to one of ordinary skill in the art at the time of invention to adaptively change the transmission rate based

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on the feedbacks from the receiver to improve the efficiency of the system as suggested by Balachandran (see column 1, lines 25-38).

As to claim 24, Sano discloses that characteristic comprises signal to interference ratio (or signal to noise ratio) of the at least one field in the received signal (see column 5, lines 56-58).

As to claim 37, Sano discloses an apparatus for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), for generating at least one reference field (see the output of the fading compensation units) (inherently by using a controller) based, at least in part, on the at least one field and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being distinct from the received signal and representative of at least one characteristic of the wireless communication channel (i.e. the SIR). Sano discloses all the subject matters claimed in claim 37, except that the field is modulated and encoded in a substantially fixed manner. Sano also does not disclose generating a signal quality estimate by comparing the at least one field in the received signal and the generated at least one reference field and to generate a difference signal, and modifying the data transmission rate of the transmitter based on the signal quality estimate. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packer

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duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate =1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract). As to the second limitation, Mobin further discloses that a viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 22-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph). Sano, Tzannes, and Mobin disclose all the subject matters claimed in claim 37, except for modifying the data transmission rate of the transmitter based, at least in part, on the signal quality estimate. Balachandran, in the same field of endeavor, discloses a communication system apparatus comprising an encoded and modulation decision unit 258, which determines the correct encoding and modulation scheme in response to the received SIR estimate 274 from the receiver 261

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(see column 14, lines 7-16). Balachandran further discloses that the adaptive channel encoder and modulator 256 then encodes and modulates the transmit data stream 252 to a predetermined scheme and transmits the information (interpreted as data) through the channel. It would have been obvious to one of ordinary skill in the art at the time of invention to adaptively change the transmission rate based on the feedbacks from the receiver to improve the efficiency of the system as suggested by Balachandran (see column 1, lines 25-38).

As to claim 19, Mobin further discloses that viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 19-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano, Tzannes, and Balachandran as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph).

As to claim 20, Mobin further disclose that the step of generating the signal quality estimate comprises the steps of: aligning the one or more constellation points associated with the at least one field in the received signal with the one or more corresponding constellation points associated with the at least one reference field; and generating difference signals for each of at least a portion of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the corresponding at

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least one reference field (see column 10, lines 12-35). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin to reduce frequency offset errors in a communication system (see column 1, last paragraph).

10. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, and Balachandran, further in view of Li.

As to claim 21, Mobin discloses generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field (see column 10, lines 12-35); and determining a magnitude of the difference signal (see column 10, line 28), the signal quality estimate being a function of the magnitude of the difference signal (see line 30). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano, Tzannes and Balachandran as suggested by Mobin to reduce frequency offset errors in a communication system (see column 1, last paragraph). Sano, Tzannes, Balachandran and Mobin disclose all the subject matters claimed in claim 21, except that instead of measuring the magnitude of the difference signal power of the difference signal could be measured. Li discloses a communication apparatus wherein the residual interfering signal is removed to improve the quality of the received signal (see the abstract). Li further discloses that the reception quality of the signal is continuously monitored by checking the power or amplitude of each sub-band signal (see paragraph 0025). Since it is well known in the art that it is easier to measure the power of the incoming signal instead of its magnitude; therefore it would have been obvious to one of ordinary skill in

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the art at the time of invention to measure power of the incoming signal to make the system more cost effective.

As to claim 22, Balachandran, further discloses using weighted (i.e. averaged) Euclidean distance metric as SIR metric (see column 7, lines 63). It would have been obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric as suggested by Balachandran (see column 7, lines 52-53 and 61-63). As already disclosed in rejection of claim 10, Li discloses that the reception quality of the signal is continuously monitored by checking the power or amplitude of each sub-band signal (see paragraph 0025). Since it is well known in the art that it is easier to measure the power of the incoming signal instead of its magnitude; therefore it would have been obvious to one of ordinary skill in the art at the time of invention to measure power of the incoming signal to make the system more cost effective.

11. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, and Balachandran, further in view of Shurvinton et al. (hereafter, referred as Shurvinton) (US 2005/0130595).

As to claim 36, Sano, Tzannes, and Mobin, disclose all the subject matters claimed in claim 34, except an integrator coupled to the comparator, the integrator being configurable for averaging at least a portion of magnitudes of difference signals corresponding to a plurality of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the at least one reference field for a given one of the

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samples, the signal quality estimate being a function of the averaged magnitudes.

Balachandran, in the same field on endeavor, discloses a system and method to measure channel quality in terms of signal to interference ratio (see the abstract).

Balachandran further discloses using weighted (i.e. averaged) Euclidean distance metric as SIR metric (see column 7, lines 63). It would have been obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric as suggested by Balachandran (see column 7, lines 52-53 and 61-63). Sano, Tzannes, Mobin, and Balachandran disclose all the subject matters claimed in claim 36, except that an integrator is used to perform the averaging function. Shurvinton discloses a communication device comprising an integrator 21, which has been used to average out the amplitude variations of the incoming signal (see paragraph 0067). It would have been obvious to one of ordinary skill in the art at the time of invention to use an integrator to determine the average of the magnitude to reduce the error in the sampled power measurement as suggested by Shurvinton (see paragraph 0067).

Allowable Subject Matter

12. Claim 35 allowed. The following is a statement of reasons for the indication of allowable subject matter: a comprehensive search of prior art of record failed to disclose, either alone or in combination, a circuit for estimating a signal quality of a signal received from a wireless communication channel, the received signal comprising at least one field that is modulated and encoded in a substantially fixed manner, the circuit comprising: a processor operative to generate at least one reference field based,

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at least in part, on the at least one field in the received signal and on a channel estimation signal, the channel estimation signal being representative of at least one characteristic of the wireless communication channel; and a comparator coupled to the processor, the comparator being configurable for generating a signal quality estimate as a function of a difference between the at least one reference field and the at least one field in the received signal; wherein the processor comprises: a slicer configurable for receiving the at least one field in the received signal and recovering therefrom a plurality of received symbol bits associated with the at least one field; a decoder configurable for correcting one or more errors potentially present in the received symbol bits, the corrected received symbol bits corresponding to originally transmitted symbol bits in the at least one field; an encoder configurable for encoding the corrected received symbol bits; a modulator configurable for converting the encoded corrected received symbol bits to a baseband signal; and a multiplier configurable for combining the baseband signal and the channel estimation signal and generating the at least one reference field based at least in part on the baseband signal and on the channel estimation signal.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner
Art Unit 2611

Application/Control Number: 10/621,862

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/L.M./

/Leila Malek/

Examiner, Art Unit 2611

/Mohammad H Ghayour/

Supervisory Patent Examiner, Art Unit 2611

Office Action Summary	Application No.		Applicant(s)	
	10/621,862		BOER ET AL.	
	Examiner		Art Unit	
	LEILA MALEK		2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 35 is/are allowed.
- 6) ☒ Claim(s) 1-34 and 36-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.


Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.


Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

<i>Index of Claims</i> 	Application/Control No. 10621862	Applicant(s)/Patent Under Reexamination BOER ET AL.
	Examiner LEILA MALEK	Art Unit 2611

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47										
CLAIM		DATE								
Final	Original	03/19/2008								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
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	36	✓								

<p align="center"><i>Index of Claims</i></p> 	Application/Control No. 10621862	Applicant(s)/Patent Under Reexamination BOER ET AL.
	Examiner LEILA MALEK	Art Unit 2611

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47										
CLAIM		DATE								
Final	Original	03/19/2008								
	37	✓								
	38	✓								